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ABSTRACT

This paper describes the conceptual framework of a research methodology developed by the Region II Rehabilitation Research Institute, designed to permit the study of an important set of problems confronting sheltered workshops. The main problem is centered in the issues of work as work and of work as mode of behavior change. It has become apparent in the operation of sheltered workshops that there were at least two subsystems of activity which could be abstracted from the concrete systems of behavior in any workshop. These are the production subsystems, similar to industry, and the rehabilitation subsystem which is new. The orientation of the rehabilitation subsystem is to rehabilitate through channeling and controlling behavior. The paper discusses basic concepts and variables of work behavior such as behavior potential, behavioral activity, and technology. Research is reviewed and research applications are discussed. These applications include possibilities for improved selective placement of clients. After more research, industrial therapy of the type available in sheltered workshops may prove to be the most effective and least costly of the therapeutic techniques used to prepare individuals for reintegration into the fabric of modern industrial life. (Author/KJ)

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A Conceptual Framework for the Analysis of Work Behavior in Sheltered Workshops

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Preface

With the publication of this paper the Region II Rehabilitation Research Institute initiates a second series of research reports, Studies in Behavior and Rehabilitation. Our original series has focused upon providing data regarding the structure and organizational characteristics of a large number of sheltered workshops. It explored and reported upon issues associated with fiscal management, wage levels, staffing ratios, and other aspects of administration. Understanding of the numerous important questions associated with problems at this level is of considerable concern to those who would see the sheltered workshop develop and strengthen its contribution to disabled populations.

Consistent with our core area of research dealing with organization and administration of sheltered workshops has been a concern with the behavioral aspects of the rehabilitative process. This series, unlike the first, deals with what may be observed to be occurring at the interface between the organization and client. We refer to our research in this area as behavioral since our approach, both theoretically and operationally, has involved observation of the behavior of clients in the socio-technical contexts of their organizations. Study of the structure and sequences of events at this interface has provided and should continue to provide insight into some of the problems associated with remunerative work as a therapy modality for disabled people.

This first published number in the new series provides an overview both of the theoretical and conceptual ideas which have guided us in our general approach and of the methodological procedures we apply to measure operationally the behaviors and contexts we have called the organization-client interface. As the reader will note our approach has not had a specific problem

focus, since we were not specifically concerned with, for example, developing a new mode of work evaluation or offering a redefinition and elaboration of a therapeutic procedure. To date we have only developed our concepts and applied them empirically in the sheltered workshop setting. We believe that as we continue to learn more about the nature of the work and social behavior of clients with varying degrees of impairment within different work settings we shall gain important clues of considerable usefulness in both the diagnostic and therapeutic stages of workshop programming. Greater understanding of these issues is critically important to those responsible for administration of organizations like workshops. Despite the numerous controversies which are associated with the "role" of the sheltered workshop, there would appear to be common agreement that restoration or development of work capacity and adjustment to the social context of work organizations is a goal for all workshops. It is to these issues that this phase of our work has addressed itself, and it is with our conceptual and empirical work in this area that this new series will deal.

The paper which follows treats matters at the conceptual level. A second paper, already undergoing revision and editing, is a comparative analysis of two clients for whom the prognoses differed substantially. This empirically oriented paper illustrates the methodology and the concepts of our approach, paying particular attention to the numerous variables developed through our procedures. These procedures, which involve among other things analysis of temporal aspects of individual behavior, represent a fairly sharp break from the conventional measurement techniques associated with many psychometric methods currently used in rehabilitation. Therefore, through these case studies, we hope to offer the interested reader an opportunity to see the outcome of our approach and thus to be able to evaluate it more thoroughly.

Beyond the case studies we have plans for publishing additional reports based upon analysis of an already large body of data. Some of these will deal with the impact of social behavior on work behavior, the relation between job and technological structure, and a broad variety of other topics. It is our hope that greater understanding of behavioral processes and their interdependence with the immediate work and social context will

enable workshop administrators to design organizations more adequately for serving clients. As the demands upon sheltered workshops to serve more severely impaired individuals increases and as the population groups served broaden to include those for whom existing programs appear inappropriate, the issues relating disability, behavior, and rehabilitation processes are likely to become paramount in the design and administration of organizations.

William H. Button,
Research Director,
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I. Introduction

This paper describes the conceptual framework of a research methodology developed by members of the SRS Region II Rehabilitation Research Institute and designed to permit the study of an important set of problems confronting sheltered workshops.[1] Previously only a set of operational instructions for this methodology was available; however, recent research efforts have provided an opportunity to test the approach and to examine its applicability.[2] Therefore, we feel that it is important at this time to provide interested individuals with a general discussion of the nature of this research tool and to locate the research in the context of other efforts to study work behavior.

At the inception of our research into sheltered employment, we became aware of a number of issues, the most important involving an organizational dilemma peculiar to sheltered workshops. Simply stated, the dilemma derives from the fact that paid work performed by disabled clients has two distinct consequences for every workshop. On the one hand, sheltered workshops enter into business relationships with outside customers to perform a variety of generally unskilled or semiskilled industrial work for which they receive income.[3] Rehabilitation activities of workshops, however, provide opportunities for the disabled to acquire

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[1]This research is supported in part by a grant from the Social and Rehabilitation Service, U. S. Department of Health, Education, and Welfare (RD–2075G) to the New York State School of Industrial and Labor Relations, Cornell University, Ithaca, New York.

[2]See Appendix.

[3]For details on the structure of income and expenses in sheltered workshops see J. R. Kimberly, *The Financial Structure of Sheltered Workshops* (Ithaca, New York: Region II Rehabilitation Research Institute, 1968), Research Report No. 3.

skills needed for economic independence. Thus, work performed by clients in workshops has important educative and economic consequences for the individuals as well as economic consequences for the organization. The problem with which we became concerned early in our research, and which subsequently led to the developments outlined here, centered in the issues of work as work and of work as a mode of behavior change.

Researchers have long been aware that the nature of an individual's work has many implications for other aspects of his life.[4] Much industrial relations research has focused on unskilled and semiskilled work, the type of work commonly performed in sheltered workshops. Often it has concluded that such work has dysfunctional consequences for those who perform it; for example, Kornhauser in his Detroit studies has suggested a relationship between various unskilled industrial occupations and indices of poor mental health.[5] He is one of many researchers who have arrived at similar conclusions.

From our research orientation, we did not have any a priori grounds for asserting that work as a rehabilitation modality was incompatible with work as an economic activity. We were aware of the extensive body of behavioral science research pointing to the alienative consequences of much industrial employment. At the same time, however, we were not aware of any conclusive evidence in the literature that the nature of tasks performed and the social relations created by participation in industrial employment were factors in the etiology of mental disease and other pathological conditions.

What became apparent to us as we became more familiar with the operation of sheltered workshops was the fact that there were at least two subsystems of activity which could be abstracted

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[4]For example, see Nancy C. Morse and Robert S. Weems, "The Function and Meaning of Work and the Job," *American Sociological Review,* vol. 20, no. 2 (April 1955), pp. 191–198.

[5]Arthur Kornhauser, *Mental Health of the Industrial Worker: A Detroit Study* (New York: John Wiley and Sons, 1965), pp. 260–292 especially. See also C. Argyris, *Personality and Organization* (New York: Harper, 1957); August B. Hollingshead and F. C. Redlich, *Social Class and Mental Illness* (New York: John Wiley and Sons, 1958); Joseph S. Murphy, "Work and Alienation Viewed Historically," *Urbanization and Work in Modernizing Societies,* Arthur J. Field, ed. (Detroit: Glengary Press, 1967).

from the concrete systems of behavior in any workshop.[6] The first of these, the production subsystem, includes those activities, materials, processes, and people involved in the production of goods and services. The second of these, the rehabilitation subsystem, includes those activities, materials, processes and people involved in the modification of client behavior. The characteristics of the former were, in the main, similar to much with which we were already familiar from our work in industry. The range in technology, the structure of work relations in jobs, the remuneration and determination of rates, and the skill and complexity of types of jobs were all similar, as phenomena, to those in industry which had been given considerable attention by behavioral scientists in the past. The rehabilitation subsystem was, however, new to us.

The principal difference between workshops and industry is the scope and range of individual behavior requiring modification within the organizational framework. If client behavior is to be modified toward vocational goals rather than merely segregated within a custodial institution, the workshop, unlike industry, must concern itself with a wide range of "inappropriate" behaviors and undeveloped potentials. Some sheltered workshops even find it necessary to develop in clients appropriate responses to financial and social incentives; and others must concern themselves with problems of continence and other aspects of personal hygiene, with the development of appropriate social behaviors in heterosexual contacts, and with a variety of other behaviors whose modification constitute the necessary, but not sufficient, conditions for participation in normal life including, of course, employment. In contrast with industry, workshops confront what may be generally described as extremely high degrees of inappropriate behavioral variances with which they must be concerned if the orientation of the rehabilitation subsystem is to rehabilitate through channeling and controlling behavior.

Various rehabilitation techniques, bringing the perspectives of many professional orientations to bear, have been developed as concern for the problems of the disabled has increased; and the rehabilitative technology is now a prominent characteristic of

[6]For further discussion of sheltered workshops from a systems perspective see J. R. Kimberly, "Sheltered Workshops: A Systems Analysis," Region II Rehabilitation Research Institute, Ithaca, New York, 1968 (mimeo).

many workshops. Thus, we often find physicians, psychologists, psychiatric group workers, mobility instructors, registered nurses, physical and occupational therapists, and many others whose jobs involve assessing incoming clients' problems of either a psychic or physiological nature and developing appropriate therapies to effect changes.[7] Early in our research, field observation of the rehabilitation subsystem suggested a few important generalizations about rehabilitation processes which subsequently influenced our research design. These generalizations follow:

I. Characteristically, those with the highest professional status in the workshop provide the *definition* of a client's "problems." The empirical basis of these definitions varies, but basically consists of medical and psychological records of the client, reports from interviews with clients and their families, and impressions formed in relatively brief observations of the client in a diagnostic or clinical setting. In some cases, psychometric tools ranging from intelligence measures to Rorschach protocols are also used;[8]

II. Therapy programs are typically designed by those individuals concerned with definition of the client's problems. Specified outcomes are generally described in terms with few empirical referents. Modification of the client's psychodynamic states and changes of attitudinal dimensions (seldom measured but inferred from secondary evidence) are the most frequent rehabilitation "objectives," aside from objectives defined in concrete vocational terms;

III. Therapeutic programs and intervention based on the original diagnosis, and the subsequently identified therapeutic objectives, are then pursued *principally on the verbal level* in counseling interviews conducted in offices. Group therapy of the guided-discussion type is occasionally used as well;

IV. Not all interventions directly involve the client; rather, they may consist of attempts at modifying sociological variables presumed to be important for the client. Thus, much attention is focused on the client's life circumstances, particularly the family and its economic and social characteristics. Work with parents is arranged; and referrals are made to welfare offices, to clinics of various types, and to other health-system institutions.

The generalizations about the operation of the rehabilitation subsystem offered here need systematic investigation, for they only

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[7]For a discussion of this dimension of sheltered workshops see J. R. Kimberly, *Professional Staffing in Sheltered Workshops* (Ithaca, N. Y.: Region II Rehabilitation Research Institute, December, 1968), Research Report No. 2.

[8]For a discussion of some of the problems involved here see, Albert Bandura, "Behavioral Psychotherapy," *Scientific American*, vol. 216, no. 3 (May, 1967), pp. 79–86.

serve to portray the general appearance of the situation in many workshops. The most critical problem created is the lack of integration between activities and programming managed by the rehabilitation subsystem and the actual daily activities of workshop clients. We have observed both systematically and generally that all but a small fraction of the client's time in a workshop is spent in production activities. Furthermore, it does not appear that professional skills of the types referred to above are brought to bear upon the technological and social structure of the production setting in which the client participates almost continually.

One is therefore left with the testable hypothesis that actual changes in behavior are either primarily produced by relatively infrequent, but highly potent, interactions and activities initiated by professionals in the rehabilitation subsystem or, alternatively, are affected by the cumulative impact on behavior resulting from participation in production settings and the associated dynamics of the social relations and technology. Our research strategy basically assumed that the objectives of the workshop were to create or modify clients' work behaviors and that modification of behavior was most likely to occur, if at all, in the context of the work situation. The point of intersection between the economic concerns of the business operation and the rehabilitation subsystem, the two subsystems of critical importance for sheltered workshops, seems clearly to be the point where job and client meet.

We should clarify at once that, while there has been some literature discussing the possibilities for therapy on the job through manipulation of the work and work setting, little of a systematic nature has been discovered about how behavioral modification of workshop clients is achieved. This, however, is no reason to disregard or abandon the concept of sheltered employment and sheltered workshops. The complexities involved in understanding the interaction between an individual's behavior and salient aspects of the job setting, both physical and social, have not been confronted by research as yet. When the facts are in, industrial therapy of the type commonly available in sheltered workshops may prove to be not only the most effective but also the least costly of the therapeutic techniques used to prepare individuals for reintegration into the fabric of modern industrial life.

II. Review of Relevant Research in Organizational Behavior

It has been central to much research in organizational behavior that there is mutual influence between job and worker. Yet, it is striking how little of an empirical nature is known about the dynamics of this situation. For example, one line of inquiry relevant to rehabilitation is human factors research. Within this orientation much has been learned about ways in which machine design and work-place design can contribute to reducing errors and increasing productivity at the man-machine interface.[9] Research of this type has contributed to overcoming many of the complex problems of restoring function to individuals who have lost one or more senses or limbs, but has left the social dimension of work for others to explore.

The work of Frederick Taylor and others of the scientific management school concerned itself with the development of techniques to measure and improve the return on expenditures of physical effort at the work place. Research which has grown out of this orientation has implications for behavior modification through improvement of methods whereby work is performed and difficult tasks are reduced to simpler components.[10] Fortunately, many important aspects of the work situation which scientific management overlooked were demonstrated to be critical in the very significant Hawthorne studies. These studies showed

[9]For an introduction to this research see Alphonse Chapanis, *Research Techniques in Human Engineering* (Baltimore: Johns Hopkins Press, 1959); S. S. Stevens, ed., *Handbook of Experimental Psychology* (New York: John Wiley and Sons, 1951).

[10]See Frederick W. Taylor, *The Principles of Scientific Management* (New York: Harper, 1911).

that an important aspect of work behavior in industry is the network of social relations which individuals develop.[11] It appears to us that the social dimension of work, which the Hawthorne studies emphasized, is an important dimension in the rehabilitation process and one to which research attention might be directed profitably. Yet, research growing out of the Hawthorne studies, suggestive as it is, provides few guidelines regarding the modification or restructuring of social relations in order to produce desired changes in individual social behavior.

Another large body of literature important to our work deals with vocational training and job instruction.[12] This literature generally covers the problems involved in designing curricula to train individuals to meet job requirements through development of the appropriate skills and the technical knowledge necessary for job performance. The vocational literature, as well as that dealing with industrial psychology,[13] provides little help to someone concerned with *changing behavior* rather than with measuring presumed innate aspects of the individual or pursuing change on the cognitive level. In some ways industrial psychology has outgrown its usefulness to sheltered workshops, for the concern among researchers in this area is often the identification of more esoteric skills than are commonly necessary for the tasks performed in sheltered workshops.[14]

Research into the concept of job enlargement has postulated dynamic interaction between the individual and his job and has focused on the problem of restructuring the nature of the work performed by individuals to provide tasks with greater "whole-

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[11]See F. J. Roethslisberger and W. J. Dickson, *Management and the Worker* (Cambridge, Mass.: Harvard University Press, 1939). For a recent reinterpretation see H. A. Landsberger, *Hawthorne Revisited* (Ithaca: New York State School of Industrial and Labor Relations, Cornell University, 1958).

[12]For a good review of this literature see William McGehee and P. W. Thayer, *Training in Business and Industry* (New York: John Wiley and Sons, 1961); also see W. H. Button and W. J. Wasmuth, *Employee Training in Small Business Organizations* (Ithaca: New York State School of Industrial and Labor Relations, Cornell University, 1964), Bulletin No. G–52.

[13]Edwin E. Ghiselli and C. W. Brown, *Personnel and Industrial Psychology* (New York: McGraw Hill, 1955).

[14]For some recent findings to the contrary see George W. Brooks and Lelon H. Weaver, Jr., *Psychomotor Performance, Mental Disability and Rehabilitation*, Final Report, VRA Grant RD 1291 (Burlington: Vermont State Hospital, n.d.).

ness."[15] Combining a series of subtasks into "logical" wholes (logical to the job enlarger), it is believed, induces changes in individual attitudes and thus reduces the tendencies toward alienation and anomie associated with the performance of highly repetitive, uncomplicated industrial work. Identification and measurement of the variables associated with the enlargement of jobs have presented formidable complexities for this line of inquiry. The social dimensions of the work place have been included only occasionally, since they were only infrequently construed as "work"; and, finally, many of the studies have focused on normal industrial workers.[16] Our understanding of this body of literature suggests that there has been a great deal of study but much left to be learned about the interaction of the task, work place, and individual. Since it is our assumption that interaction between the social environment, the task, the technology, and the individual produces the appropriate modification of behavior, the job enlargement literature has certain relevance.

Although the existing literature regarding the interaction of tasks, social setting, and individual variables fails to provide a large body of confirmed empirical relationships, much of it has suggested areas of research. Most of the concepts which ultimately entered our operational procedures were derived from our reading and understanding of such literature.

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[15]C. R. Walker, "Work Methods, Working Conditions and Morale," *Industrial Conflict,* Arthur Kornhauser, R. Dubin, and A. Ross, eds. (New York: McGraw Hill, 1954).

[16]For an exception see Arthur Turner and Paul Lawrence, *Industrial Jobs and the Worker* (Cambridge, Mass.: Harvard Business School, 1965).

III. Description of the Basic Concepts and Variables

From the beginning it became apparent that our undertaking could not be formulated in terms other than *systems terms.* We felt it would be premature to specify any group of variables as causal without first describing and defining behaviors observed in the matrix of the work setting. It might have been possible to formulate our research in terms which had either explicit or implicit causal implications. Since we were at a basic exploratory stage, however, we felt that such a strategy might prove shortsighted in that it might tend to give overemphasis or even exclusive emphasis to particular variables to the exclusion of others.

As our thinking about work and rehabilitation began to take shape, it appeared heuristically useful to conceptualize the work setting in terms of three general elements: behavioral activity, social ecology, and technology. We share the view of such researchers as Emery, Trist, Bamforth, and others that the work setting can be viewed as an open socio-technical system, a view which implies the interdependence of the elements mentioned above.[17] The Diagram presents the basic model and provides an overview of the elements and of the first order variables to which our operational definitions and measurement procedures are applied.

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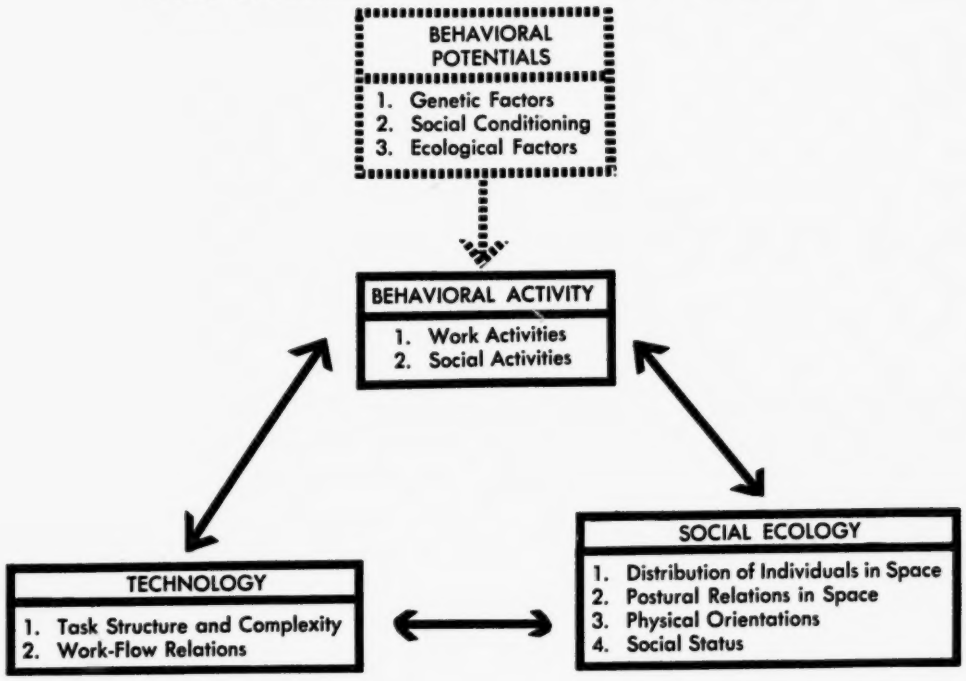
[17]F. E. Emery and E. L. Trist, "Socio-Technical Systems," *Management Sciences and Techniques,* Vol. II (London: Pergamon Press, 1960). For another view which has influenced our thinking considerably see E. D. Chapple, "Towards a Mathematical Model of Interaction: Some Preliminary Considerations," Research Facility, Rockland State Hospital, Orangeburg, New York, 1968 (mimeo).

Basic Elements in a System of Work Behavior



Behavioral Potential

We hypothesize that the client, or any individual in a more general sense, brings to the work setting a complex set of behavioral potentials. These potentials, which are an important input into the system, are a function of both the individual's biological constitution and his previous environmental experiences. Biologically, the client reflects the consequences of interaction between his genetic endowment, varying physiological conditions, and previous and current therapeutic interventions. Similarly environmental effects may be viewed in terms of social and ecological factors. An example of the interaction of these factors (and we do not attach any particular superior significance to genetic or environmental factors) is hallucination. Some hallucinatory behavior in its remarkable periodicity *apparently* reflects underlying biological rhythms which have manifest consequences for the social relations of the individual.[18] Eliot Chap-

[18]For a recent investigation see Robert P. Kimberly, "Rhythmic Patterns in Human Verbal Interaction: A Case Study," honor's thesis, Princeton University, 1968.

ple and his associates have demonstrated that hallucinations, and other types of idiosyncratic behavior manifested by the mentally ill, have such highly predictable occurrences that they may be sampled using statistical quality-control techniques and subsequently *may* become dependent variables in studies of the outcome of various therapies of either a psychoanalytic or pharmacological nature.[19] Much remains to be done in the behavioral sciences to identify more accurately the behavioral potential which an individual has at a particular time. There have been a number of suggestive approaches in this area which we have found useful in our thinking, but it is beyond the scope of this paper to discuss them fully at this time.

The box to which we refer as behavioral potential is empirically empty so far in our research. We have discussed behavioral potential because it is logically related to the three empirical clusters of variables with which we have become especially concerned. We must now discuss these in some detail.

Behavioral Activity

Our research focuses on two aspects of behavior which we observe and measure in the work setting. These are the frequency, duration, and sequence of *work-activity events* and frequency, duration, and sequence of *social contacts* among individuals. As will become more apparent, it is only analytically useful to make the distinctions suggested in the Diagram for we feel that there is *reciprocal influence* between the behaviors which we observe and record and the other two elements of the scheme.

Our observations are limited to the time when individuals are participating in scheduled work activity; this limitation permits precise observation of an individual's work behavior. For our purposes a work-activity event is defined as a period of time during which the client is performing task-related activities. We measure the duration of each work-activity event or, to be more specific, the length of time an individual continues to perform his assigned task. The majority of the tasks performed in sheltered

[19]A. H. Esser, *et al.*, "Productivity of Chronic Schizophrenics in a Sheltered Workshop: A Quantitative Evaluation of the Effects of Drug Therapy," *Comprehensive Psychiatry*, vol. 6, no. 1 (1965), pp. 41–50.

workshops are relatively short-cycle repetitive operations.[20] Because of the short time involved, we can measure the number of work cycles completed within any particular work-activity event. Naturally, there are times when an individual is not working; and our procedures provide accurate measures of the duration of non-work periods as well. Generally, we can determine at the end of any particular non-work unit the extent to which factors other than those controlled by the individual contributed to the cessation of work. Therefore, we focus upon non-work units and determine in each instance the extent to which any delay was determined by the personal or idiosyncratic aspects of the client or by technological or social aspects of the situation. For example, if we observe that a client has run out of parts for his task, rises from his chair, and goes to another part of the room to resupply himself, we would indicate that a supply delay had occurred. If the client stops work for no visible reason, however, we infer that there is some endogenous or intra-psychic cause attached to this and characterize the delay as "personal." As may now be apparent, measurement of the duration of work-activity events and of the numbers of work cycles performed by clients in sheltered workshops provides an extremely accurate measure of the individual's flow of productive behavior, an important aspect of his rehabilitation defined in terms of work capacity.

To summarize, we obtain measures of two variables, work and non-work (delay) and keep concurrent records of the number of work cycles completed and the nature of the delays that occur.

Concurrent with our measures of productive behavior are recordings of the social contacts which the individual has during the time when he is being observed.[21] As with the measures of productive behavior, we make precise measurements of the duration of social contacts. Ordinarily, of course, these contacts involve

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[20]For information on the skill classifications in sheltered workshop jobs see W. H. Button, *Wage Levels in Sheltered Employment* (Ithaca, N. Y.: Region II Rehabilitation Research Institute, 1967), Research Report No. 1; also William H. Button and B. K. Lubow, *Production Systems in Sheltered Workshops* (Ithaca, N. Y.: Region II Rehabilitation Research Institute), in press.

[21]For an early discussion of the measurement of social interaction see, Eliot D. Chapple, "Measuring Human Relations" in *Genetic Psychological Monographs*, Vol. 22, 1940, pp. 3–147

verbal communication; but we also include gestures, signals, and tactile interaction. Research by Birdwhistle and Scheflen has suggested the complex interrelationships between these less often studied forms of interaction and purely verbal aspects of social behavior. Some research has pointed out that the lack of integration between non-verbal and verbal interaction of certain individuals is a defining characteristic of mental illness.[22]

The duration of the social contacts which we observe is determined by the following criteria: The initiator of interaction provides the first stimulus to another individual, whose behavior is subsequently modified in relationship to the first. We measure the duration of time in which it can be observed that the behavior of both individuals is interdependent, in which each person continues to be a stimulus for successive responses on the part of the other. The terminator of interaction is that individual whose last unit of interaction does not constitute a stimulus for a subsequent unit from the other individual.

Our procedures provide us simultaneous measures of the frequency, duration, and sequences of both work and non-work units and of social interaction. Since we are measuring simultaneously, we can investigate one of the most frequently discussed dichotomies in social science, the distinction between task behaviors and socio-emotional behaviors. We feel that our research will be useful in investigating the interdependence of work behavior and social behavior in the terms which we have defined. We suspect that there are certain important idiosyncratic differences among people in this respect and that these differences are an important dimension of "personality" which must be investigated and analyzed within the perspective of rehabilitation objectives and strategies.

Social Ecology

As we have previously discussed, the Hawthorne studies focused considerable attention on the relationship between social struc-

[22]Albert E. Sheflen, *Stream and Structure of Communicational Behavior* (Eastern Pennsylvania Psychiatric Institute, Commonwealth of Pennsylvania, 1965), Behavioral Studies Monograph, No. 1. R. L. Birdwhistle, *Introduction to Kinesics* (Louisville, Ky.: University of Louisville Press, 1952).

ture of work groups and work settings. The implications of this research have led us to focus on what we call the social ecology of the work situation.

Inadequate opportunities for social interaction or differential availability of interactional opportunities may have a significant impact on the development of an individual's social repertoire. For this reason the second element of our scheme focuses on the distribution of individuals relative to the *individual being observed*. Using the work of Edward Hall, an anthropologist who has provided some suggestive guidelines for the study of spatial relations among individuals, we record a number of proxemic variables relevant to both the social contacts our subject has and the general setting in which he is observed.[23] These include measures of distance, posture, and body orientation which are recorded for each contact and for all individuals who are within 12 feet of the client. In addition all individuals related to the client in a technological sense, which we will discuss shortly, are recorded on these dimensions. Naturally, the client does not interact with everyone around him. In fact we notice, as we study client interaction, that the distribution of clients' contacts varies considerably both in terms of its spatial characteristics and in terms of patterns of initiation and termination of interaction. Measurement of these aspects of the social ecology of work settings, we believe, will provide an important basis for empirical identification of status relationships among clients.

The work of Longabaugh and others has suggested to us the importance of transactional relationships among individuals.[24] We hope to investigate more thoroughly the relationship between the characteristic transactional or exchange relationships in which clients are able to participate and their work settings. We feel

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[23]See Edward T. Hall, "A System for the Notating of Proxemic Behavior," *American Anthropologist,* vol. 65, no. 5 (October, 1963), pp. 1003–1026. Also by the same author, *The Silent Language* (New York: Doubleday, 1959), and *The Hidden Dimension* (New York: Doubleday, 1966). For an empirical investigation see, O. Michael Wilson and Theodore Graves, "Quantitative Research in Proxemic Behavior," *American Anthropologist,* vol. 68, no. 4 (August, 1966), pp. 971–985.

[24]Richard Longabaugh, *et al.,* "The Interactional World of the Chronic Schizophrenic," *Psychiatry,* vol. 29, no. 1 (February, 1966), pp. 78–99. Also, Richard Longabaugh, "A Category System for Coding Interpersonal Behavior as Social Exchange," *Sociometry,* vol. 26, no. 3 (September, 1963), pp. 319–344.

that the development of social behaviors which enable clients to enter into exchange relationships from which they reap a "fair profit" may be an integral part of rehabilitation. In other words, it is our contention that rehabilitation involves not only the development of individual skills and psychomotor performances, but also the development of the clients' ability to increase their "social capital" insofar as a certain degree of such "capital" is necessary for any individual to participate in the life of his community. "Social capital," for our purposes, is the extent to which any individual can mediate outcomes for others in social interaction.[25]

Technology

The final aspect of the work setting to which we give explicit methodological attention during our observations is technology. An increasing amount of organizational-behavior research is shedding light on the significance of the characteristics of the technological system within an organization as it bears upon certain important behavioral dimensions.[26] The importance of technological factors in industry has been identified by numerous people including Whyte, Chapple, Horsfalls, Arensberg, Walker, and Sayles among others.[27] In our procedures we give attention to the structure and the complexity of the task and work flow. Measurement of the first factor is based on the work of Turner

[25]*Ibid.*

[26]The concept of technology as a system of patterned behaviors and activities is discussed in E. D. Chapple and C. S. Coons, *Principles of Anthropology* (New York: Henry Holt and Company, 1942).

[27]The influence of technological factors on social relations has been emphasized in much research. The following authors have provided empirical evidence: William F. Whyte, *Men at Work* (Homewood, Illinois: Irwin-Dorsey, 1961); Leonard F. Sayles, *Behavior of Industrial Work Groups* (New York: John Wiley and Sons, 1958); E. D. Chapple and L. F. Sayles, *The Measure of Management* (New York: MacMillan, 1961); Charles R. Walker and Robert H. Guest, *The Man on the Assembly Line* (Cambridge, Mass.: Harvard Press, 1952); F. L. W. Richardson, *Talk, Work and Action* (Ithaca, N. Y.: Society for Applied Anthropology, 1961), Monograph No. 3; A. B. Horsfalls and C. M. Arensberg, "Teamwork and Productivity in a Shoe Factory," *Human Organization,* vol. 8, no. 1 (Winter, 1949), pp. 13–25.

and Lawrence.[28] For each job observed we record the number and variety of different parts, tools, controls, substances, machines, etc., with which the client is concerned in the performance of his job. These quantitative measures are supplemented by a narrative description of the job.

Next, we turn attention to the second factor, work flow. In this regard we are principally concerned with identifying the degree of temporal interdependence between the client's job and other jobs being performed concurrently. Many tasks which clients perform permit them to remain temporally independent of others most of the time; only rarely must they depend on other individuals in order to continue performing their work. Many jobs, however, involve synchronization of the work behavior of two or more individuals. In these kinds of jobs, a client may be at the beginning of the work flow and, as a consequence of his own rate of work, control the subsequent behaviors of all the individuals whose work must be performed after his own. Alternatively, he may be at the end of a sequence of task activities and thus depend on the work behavior of others. There are numerous subtleties for which we attempt to account in classifying and describing the work-flow situations which we have studied. There appears to be considerable interdependence among the social behavior which we record, the client's behavior relative to his social space, and the work-flow location in which he happens to be at a particular point in time.

[28]Turner and Lawrence, *op. cit.*

IV. Research Applications of the Work Behavior Observation Scheme

The Work Behavior Observation Scheme was developed in light of a number of research problems in sheltered workshops. At this time, application of the methodology has been limited to initial testing and pilot projects in six workshops. We anticipate applying the methodology in a number of ways to study problems associated with the manipulation of work settings, job complexity, social ecology, and social interaction. These studies will be primarily concerned with isolating the significance of different variables as they relate to client behavior and rates of client behavior change, our two basic dependent variables.

As mentioned earlier in this paper, assessment and evaluation of client potential and development of appropriate therapy sequences are the basic activities of the rehabilitation subsystem. In the past, medical diagnoses of the client's condition and psychological attributes reflecting the client's potential and attitudes have been emphasized. Data of this type appear to be necessary, but insufficient, information for the planning of therapy in which work experience is to play a major role. Whereas some might argue that the role of the workshop is to "produce workers" and that consideration of behaviors other than those associated with performance of work is irrelevant and peripheral, we would suggest that any data which might contribute to modifying the client's vocational behavior are important. Rehabilitation programs, it seems to us, should not be based uniquely on the insights of particular disciplines; rather, they should be developed with the explicit recognition of the potential contributions of several areas of inquiry.

Meyer, Litwak, *et al.* have recently pointed to some of the desired characteristics of research data and information of obvious relevance to the problem of work evaluation of clients.[29] Among the characteristics of information needed, they stress the importance of three aspects: (1) the information should have *content relevance* in so far as it deals with appropriate substantive material; (2) the information or data should have *predictive potency;* (3) the data or information should have an *engineerable referent,* meaning that it should be both identifiable and observable and manipulatable and operational. The information which we gather through systematic sampling of client behavior in work contexts meets these criteria. Regarding *content relevance* and *predictive potency,* the Work Behavior Observation Scheme provides highly detailed information on the duration and frequency of task performances (obviously associated in some degree with the innate aptitudes measured by many tests of psychomotor functioning, such as the Purdue Pegboard or the more recently developed Tower System), while also focusing on concurrent social behaviors. This latter aspect, overlooked in most psychometric measurement situations and in nearly all job evaluations and descriptions has been demonstrated to be interdependent with rates of productive behavior.[30] While psychometric measures may provide important information regarding one factor significant in the understanding and prediction of a client's work performance, their usefulness is limited to the extent that they disregard other factors (e.g., social behavior and contextual variables).[31] In so far as our measurement system provides quantitative, continuous measurement of the technological, productive, and social aspects of work, it satisfies the criterion of content relevance.

As previously noted, the Scheme measures observable aspects of behavior and work contexts. This approach permits the isola-

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[29]Henry J. Meyer, *et al.,* "Social Work and Social Welfare," *The Uses of Sociology,* Paul F. Lazarsfeld, W. H. Sewell, H. L. Wilensky, eds. (New York: Basic Books, 1967), pp. 156–190.

[30]See William Foote Whyte, *Money and Motivation* (New York: Harper, 1955); also Amitai Etzioni, *Modern Organizations* (Englewood, N. J.: Prentice Hall, 1964), especially pp. 34–35.

[31]Illustrative of research focusing on social reinforcement is Gerald D. Patterson, "Responsiveness to Social Stimuli," *Research in Behavior Modification: New Developments and Implications,* L. Krasner and L. P. Ullman, eds. (New York: Holt, Rhinehart and Winston, 1966).

tion and experimental manipulation of contextual elements affecting the work and social behavior of clients. For example, the response of a client to social interactions with professionals, supervisors, or other clients can be assessed in terms of his work behavior. Furthermore, because repeated observations can be made these measures can demonstrate the impact of such manipulation on client behavior over time. As such they are relevant to the activities of sheltered workshops, whose unique potential lies in their ability to develop and exercise appropriate control over changes in client behavior. In addition, since the measures are of observable aspects of behavior and work contexts, they are readily comprehended by those who administer and supervise the production activities, a fact of considerable importance when the results of the measurements are discussed and become the basis for experimental manipulation of work settings for clinical or therapeutic purposes.

Related to the application of the Scheme in assessing and evaluating client work performances are its possibilities for improved selective placement. Studies of placement have often related demographic, psychometric, and rating-scale measures of individual clients to factors such as tenure on jobs in competitive employment, earnings, and productivity. The specific influence of various workshop experiences on client placement, however, has yet to be clearly determined. Since the Scheme may be used to study the characteristics of most industrial jobs, the possibility exists for development of more accurate and appropriate description of jobs in competitive employment where clients may be placed. We hypothesize that improved ability to measure a client's characteristic work and social behavior repertoires in workshop production contexts, coupled with a description of potential jobs in competitive employment, should increase ability to predict client adjustment to industrial situations. Such a multidimensional analysis can provide insight into the major causes of client turnover on jobs and, thus, can potentially reduce its occurrence. In this regard we find ourselves in agreement with other researchers who have stressed the significance of social behavior in their research on the rehabilitation process.[32] Thus we hypothesize

[32]At the present time Eliot D. Chapple is conducting large scale research into aspects of critical social behavior under Social and Rehabilitation Services and National Institute of Mental Health grants at Rockland State Hospital,

that the failure of clients to hold competitive jobs is related, in many instances, to an inability to adapt to the social aspects of work situations rather than an inability to perform at appropriate levels of production.

Investigation of a variety of other important research questions may also be facilitated through application of the Scheme. At the present time information derived from the Scheme is being utilized to determine the effect of a variety of incentive and reward schedules on productive behavior. These include both instrumental rewards, particularly money, and intrinsic rewards such as praise. The impact on productive and social behavior of clients supervised in different "styles" will also be examined, as the information about social contacts obtained by the Scheme is further analyzed. Finally, in what we believe to be a unique case study, periodicities in bizarre behavioral manifestations have been identified in an individual variously diagnosed as brain-damaged, schizophrenic, and retarded.[33] This study, and we hope others like it, will point to some answers for the difficult questions involved in managing pathological behavior confronted by those workshops serving severely disabled individuals.

As they are typically established and planned, organizations grow, are structured, and administered in light of the generalized goals of the founders and are limited by the resources at their command. This generally means that organizational structures are planned from "the top down," rather than from the bottom up.[34] The behavioral, social, and technological aspects of the organization's operations are often obscured by the problems of administration. As a consequence, the "work" of the organization often is performed in spite of, rather than because of, the organizational superstructure which "exists" to direct and support it. In the

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Orangeburg, New York. Similarly, Dr. Mary Ann Tydlaska has investigated aspects of social behavior, particularly client-supervisor interaction in workshop settings under an SRS grant to Wayne State University. See also Asher Soloff, *A Work Therapy Research Center* (Chicago, Ill.: Jewish Vocational Service, 1967), Monograph No. 7. This is the final report of Project RD–641, Vocational Rehabilitation Administration, U. S. Department of Health, Education, and Welfare, Washington, D. C.

[33]See Robert P. Kimberly, *op. cit.*

[34]This is particularly true in situations where the technology is not clearly understood. An appropriate contrast might be the rehabilitation process in workshops as compared with the production process of the auto industry.

case of sheltered workshops many questions regarding modification of client behavior through the use of work need to be more fully understood if workshops are to improve their ability to achieve rehabilitation goals. A major aim of our research is to understand the *process* of rehabilitation in workshops. Adequate understanding of the influence of work contexts and production situations on the individual must be the basis for rational development of industrial therapy as a major tool in the hands of organizations serving the disabled. With this knowledge, the problem of organization and administration of sheltered workshops will be grounded on a clear conception of what constitutes appropriate use of work as a therapy technique.

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APPENDIX

Operational Procedures: Work Behavior Observation Scheme

The following procedures for making systematic sample observations of the clients' work behavior involve both the measurements of various behavioral acts through the use of a remote-control recording device and the notation, on the Work Behavior Observation Log, of various characteristics of these behaviors and the setting within which they occur.

The observer is equipped with a special clipboard connected to a box with three buttons labelled "A," "B," and "S" which transmit signals to the recording device. This device is essentially a tape recorder which records sound frequencies transmitted by the buttons. While "buttoning" behavioral acts the observer also keeps the records listed in the instructions to follow.

For each tape used on the recording instrument, a Remote-Recording Control Log shall be filled out so that the taped data may be collated with the corresponding Work Behavior Observation Log. The RRC Log lists the order of the observations and identifies the subject; it also contains certain other information. (See the sample RRC Log reproduced at the end of this Appendix.)

The buttons on the clipboard are used as follows: The "S" button is depressed for a second at the beginning and end of each observation. The recording device counts each "S" button depression, and the observer should record this number on the RRC Log at both the beginning and end of each observation. This makes it possible to separate accurately the observations on the tape. The "A" button and "B" button measure work behavior and social behavior respectively as will be described in the following sections.

The instructions to be presented will correspond to the three pages of the Work Behavior Observation Log. The reader is encouraged to study the sample pages presented at the end of this Appendix when reading the instructions. Sheet One is to be used for the actual recording operations made in conjunction with the recording device. Sheet Two is to be filled out before the observation, and Sheet Three at the conclusion. The instructions will be presented in the sheets' numerical order not in order of the operations actually performed. It is important to remember, therefore, that *Sheet Two is filled out first.*

Observational Procedures and Operational Definitions Relevant to Sheet One of the Work Behavior Observation Log

I. Work Delay Sequence

A. *Work-Activity Events* — The remote-control recorder is used to measure the frequency and duration of work-activity events which are defined as the specific behaviors associated with the performance of given tasks. Each task, it will be observed, has such a specific and observable pattern of activity. Completion of one cycle of a particular pattern of activities will constitute a unit of production. The manipulation of task-related material objects will be associated with each unit of production. When the client is engaged in such manipulation he will be said to be engaged in work activity. Each break in a particular pattern of work activity shall be recorded as delay time. The beginning of each work-activity event shall be recorded, regardless of the inferred "correctness" of the activity observed, by depressing the "A" button for the duration of the event. If the client changes jobs during the observation (and there is no delay separating the two activities), the "A" button will be released for a second and then depressed again to indicate the point at which the change occurred. Similarly, if the client changes from one type of delay to another without an intervening work-activity event, the "A"

button should be depressed for a second and then released to indicate the point at which the delay changed.

B. *Delays* — A delay shall be defined as an observable break in the pattern of work activity. Four major types of work delays may be observed:

1. *Personal Delay* — A personal delay occurs when the client is no longer performing the work activity associated with his tasks, despite the availability of the necessary material objects.
2. *Work Delay* — A work delay will be defined as a break in the client's work activity which is directly attributable to an interruption in the flow of work. An example of such a delay would be a shortage of materials available for the job.
3. *Supply Delay* — A supply delay occurs when the client is engaged in some purposive activity which is related to his job, but which is not part of that job as described in the Object Scope and Narrative Description of Job (see sheet 2). Examples of such delays would be the client leaving his work station to get more materials or stopping to clear his work station.
4. *Other Delay* — Other delays are situations which break the cycle or pattern of work activity for the client and other persons in the work group. Such delays would include the coffee breaks, lunch periods, or other breaks in productive activity which are demanded by the supervisory group or are the policy of the organization. Also to be included in this category are those delays which cannot be readily distinguished as either personal, work, or supply delays. Special comments regarding the nature of these delays should be made by the observer.

Delays are recorded by releasing the "A" button. A notation should be made on the observation sheet *each* time the "A" button is released. The observer should place a "D" in the appropriate box in the Work Delay Sequence Log with a subscript denoting the type of delay which occurred. A "p" subscript should be used to denote a personal delay, "w" for work delay, "s" for a supply delay, and "o" for other delay.

C. *Recording Work Delay Sequence* — The Work Delay Sequence Log is composed of four rows of boxes in which several types of notations are to be made. A "1" is to be recorded upon the completion of a unit of production (i.e. for each completed work cycle) and a "D" with the appropriate subscript is to be recorded each time a delay occurs (each time the "A" button is released). While work activity is being recorded ("A" button depressed), a "1" should be marked in consecutive boxes on the

log each time the subject completes a unit of production. When a delay occurs, the "A" button is released and a "D" with the appropriate subscript is entered in the next box on the log. When work activity resumes, the "A" button is depressed and the observer notes the completion of each unit of production. If a delay should occur in the middle of a unit of production, it is recorded and the "1," denoting completion of that unit, is not made until it has actually been completed, that is, after the delay. If a client fails to complete a work cycle between two delays (in which case a "1" is not recorded) a letter "A" will be recorded between these delays to indicate that the client has worked in that interval but failed to complete a work cycle.

If the client being observed does more than one job (as indicated on page two of the Log), the completion of cycles of the second job should be recorded by marking a "2" in the appropriate box each time a unit of production is completed.

II. Contact Sequence

A. *Contacts* — The durations and frequency of the clients' social contacts will be recorded through use of the remote-control recorder. A contact is said to take place when the observed behavior of two or more individuals is mutually dependent, that is, when one person's behavior acts as a stimulus for the behavior of any other or others. Contacts may include verbal and non-verbal behavior. A contact is recorded by depressing the "B" button from initiation through termination of contact.

B. *Initiation of Contact* — An initiation of contact occurs when the behavior of one individual changes the behavior pattern of another individual or individuals. The individual whose first act produces a response from another is said to be the *initiator.*

C. *Termination of Contact* — A termination of contact occurs when a unit of interaction from one or the other involved in the contact does not evoke a subsequent unit of interaction from the other in the contact. The individual emitting the last interactive unit shall be designated the *terminator.* Terminations may include both verbal and non-verbal behavior.

D. *Recording the Contact Sequence*—Observations of the contacts will be recorded in the Contact Sequence Log using the following coding scheme:

1. *Classification* — A notation should be made of the classification of the person with whom the subject is in contact, by marking the appropriate letter in the space provided.

C — Other client
B — Attendant
S — Supervisor or foreman
P — Professional
A — Administrator
O — Other personnel (explain)
Self — (used for hallucinations)
G — Group (used for set events)
Unknown — Other is unidentifiable

2. *Number* — Each person in the workshop should be assigned a number prior to the beginning of the observations. This number should be recorded as a subscript to the classification. If the classification is G (used for set events) the appropriate subscript is the number of individuals to whom subject is initiating. No numerical subscript is recorded following the classification self, or unknown.

3. *Name* — The name of the person with whom the subject is in contact may be recorded in the space provided, although this is not essential.

4. *Initiator* — A notation should be made of the person initiating the contact. This is done by marking an "S" in the appropriate box if the subject initiates and an "O" if another initiates.

5. *Posture* — The posture of both the subject and the other person involved in the contact should be recorded both at the beginning and the end of the contact in the appropriate boxes. The four categories of posture, followed by the symbol to be recorded, are as follows: walking , standing , sitting , and lying . In addition, the observer will record the direction, if the posture category is walking, by adding an arrow pointing toward or away from the other participant in the contact. In the case of a set event initiated by subject (classification G), an hallucination (classification self), or an "unknown" interactive partner, no posture shall be recorded for the other person.

6. *Terminator* — A notation should be made of the person terminating contact. This is done by marking an "S" in the appropriate box if the subject terminates and an "O" if other terminates.

7. *Distance* — The distance separating the individuals involved in the contact should be recorded in column D with the distance category representing the closest the individuals approached one another during the contact. Categories to be used are the following:

1. O — 3′
2. 3′ — 7′
3. 7′ — 12′
4. > 12′

In the case of a set event initiated by subject, an hallucination, or an "unknown" interactive partner, no notation shall be made.

8. *Directional Orientation* — A notation should be made of the modal relative positions of the individuals' shoulders during contact by recording the diagram which best describes the orientational relationship under the column headed DOR: There are five diagrams which shall be used: = face to face; = back to back; = side by side; = at an angle; = in column. In the case of a set event (initiated by subject), an hallucination or an "unknown" interactive partner, no notation shall be made.

9. *Comments* — If appropriate, one of the following four comments should be recorded in the space provided:

a. *Non-Response* — If an initial interactive unit by one party fails to elicit a subsequent interactive unit, the situation is said to be one of non-response and the appropriate comment should be recorded. (In such a case the initiator is also the terminator of the contact.)

b. *Set Event* — A set event occurs if a contact is initiated to more than one individual. If subject initiates the set event, the proper classification is G. If another initiates the set event, his classification should be recorded.

c. *Set Event Non-Response* — This is said to occur when either subject or another initiates a set event which produces no subsequent unit of interaction.

d. *Hallucination* — A hallucination is said to occur when subject is engaging in social behavior with no readily observable object or partner. This is distinguished from "unknown" since with the latter category the observer is aware of another person being involved but cannot recognize him (as in the case of subject's responding to someone's sneeze).

Observational Procedures and Operational Definitions Relevant to Sheet Two of the Work Behavior Observation Log

III. Control Information

For the purposes of data analysis this information must be filled out accurately so the Logs can be correctly matched with the computer print-outs:

A. *RRC Number* — This number should match that found at the top of the Remote Recording Control Log being used at the time.

B. *Tape Number* — This number should be identical with that of the tape being used to record the particular observation.

C. *Observation Number* — This number should correspond to the number being used for the particular observation on the Remote Recording Control Log.

D. *Observer* — The observer should record his name in the space provided.

E. *Date* — The date of the observation should be recorded in the space provided.

F. *Time, Beginning and End* — The time the observation began and ended should be recorded to the nearest minute.

G. *Job Title* — The subject's job title (if any) should be recorded in the space provided.

IV. Object Scope

The Object Scope must be determined in order to identify the number and variety of six classes of physical objects with which the client is concerned in the performance of job-related physical activities. The following definitions refer to the six classes and should be used as a guide in all tallies:

A. *Parts* — All objects which become part of the client's product are to be classified as parts. Ordinarily parts, or objects, are brought to the client's work station and subsequently leave his work station after he has performed an operation upon them. Particular attention should be paid to the variety of parts involved during the period of observation. While it is entirely possible that the client will work on large numbers of similar parts, the variety of these parts may be very low or very high. In the event that the client is working upon a salvage operation involving the classification of assortments of physical objects, the number of separable sorting classifications will be used to designate the variety of the product parts which are involved in this case.

B. *Tools* — All physical objects used to shape, form, or otherwise modify the product or product-processing equipment shall be designated as tools. This category includes both the customary forms of common small hand tools, such as screw drivers and pliers, and all devices which may be used to perform mechanical operations upon the product or the equipment used in producing the product. Also to be included in this category are all measuring devices such as micrometers, and all jigs and fixtures used by the client in the performance of his task should be included.

C. *Machines* — The number of pieces of equipment using sources of power other than the client's own physical energy, such as electric power, will be classified as machines.

D. *Controls* — For each machine which is employed by the client in the sample period there will be a number of different controls which enable him to regulate, adjust, or modify the machine's work. The number of switches, hand controls, and adjustment controls which the client actually physically manipulates during the course of the observation period will be classified as controls.

E. *Substances* — In some jobs it will be observed that the employee applies or utilizes liquid or gaseous material in his work. The number of different substances will be recorded hence. Examples of such substances might be the use of air under a jet to remove chips or foreign substances from the work area, the use of glues or adhesives to bind or join parts of a product, or the application of paints or other types of finishes to a product. The

number and variety of these substances will be included in this particular measure.

F. *Data* — If the client's work activities during the period of observation involve working with either alphabetic or numerical recorded symbols, the following procedures will be used to record the number and variety of the work activities involved. Three basic types of operations involving these types of materials will be observed:

1. *Recording/Counting* — On some jobs the principle activity involved with data of whatever type consists of periodically recording one or several symbols. In these cases the variety of categories of symbols which are used will constitute the variety element in the job. For example, if a client is observed to be recording his name, the date, the hour, and the number of pieces which he has completed, this would indicate that he is working with four different categories of data. Therefore, the variety of data would be four and the number of data would be four. If a person is simply counting the number of pieces he has completed, both variety and number of data would be one.
2. *Transposing* — A second type of activity involving the manipulation of written symbols or data concerns transferring, or transposing them from one form to another. Activities of this type include transcription of letters, preparation of addressograph plates from lists, or preparation of a stencil from written material. Here, the observer should focus upon the variety and means used in a process and indicate the types of equipment that are used in this particular situation. It will not be necessary to count or to enumerate the number of items of data which are actually manipulated.
3. *Collating* — The final type of operation involving the manipulation of written data or symbols will be observed when the client assembles or collates lists, documents, etc. In these particular jobs the sequence required by the collating effort should be noted; for instance, it should be observed whether a simple alphabetic or numerical system or a combination of the two is used. The use and arrangement of different colored materials in a particular sequence or order could further complicate recording of this operation. Close attention to the rationale of the collating or assembling job is required; and the character and nature of the particular assembling or collating job should be indicated on the observation sheet.

When the observer is recording observations concerning data, a "1," "2," or "3" in the appropriate space on the log sheet will denote which of the preceding categories were observed; any

comments or notes of explanation should be made in the space provided on the sheet.

G. *Other* — Uncategorized materials, substances, or physical objects used in the job will be included in this dimension. Any special problems involved in measuring this dimension should be discussed and amplified in the special remarks section of the sample observation sheet.

Object Scope recordings should include entries in the spaces provided for both number and variety of each of the six classes of objects manipulated in job performance. Should the client be observed performing two distinct jobs during the observation period, separate entries for each job should be made in the Object Scope Log and should include the number and variety of classes of objects manipulated.

V. Comments on Data

Included in this space should be any comments related to the nature or kind of data being used or collected. (See IV–F, 1–3).

VI. Narrative Description of Job

First, the appropriate word should be circled to indicate whether the subject was involved in a *team* or an *individual* activity. A team work activity, as distinct from individual work activity, occurs when the work activity of the observed is temporally either dependent upon or interdependent with preceding or subsequent work activities of other individuals. In the space that follows this entry, a brief, concise description of the subject's job or task should be given: this description should include the nature of the task, the objects involved, and the operations performed.

VII. Set Events: Description

Included in this section should be a sequential enumeration of any and all set events which occur during the observation period plus a brief description of their nature and of the subject's behavior.

VIII. Work-Place Layout and Work Flow

In the space provided on the observation sheet, sketch a rough map of the work-place layout and the work flow. Included in this map should be:

A. The area in which principle work activity is performed. Major physical objects (tables, machines, other work stations, divider walls, etc.) should be sketched according to their basic arrangement.

B. The distribution of other persons in the immediate work area is to be designated by using the symbols employed in postural differentiation. (walking , standing , sitting , and lying)

C. Direction of the flow of materials to and away from subject's work area should be designated by solid-line arrow(s).

D. If subject is involved in team work activity, work flow should be indicated by a broken-line arrow.

IX. Other Comments

This section is reserved for any special relevant comments the observer has concerning special conditions existing on the work floor during the period of observation.

Operational Procedures and Operational Definitions Relevant to Sheet Three of the Work Behavior Observation Log

I. Total Observational Matrix

The Total Observational Matrix should record the gross ecological relationships of the observational period. It, therefore, will be filled out at the end of the observation and will describe other

persons in relation to the subject on the basis of four variables: distance, work flow, posture, and directional orientation. Included in the Matrix will be all persons who are within twelve feet of subject, or are technologically related to him (regardless of distance), or who (not satisfying the former conditions) interact with subject during the course of the observation.

The Matrix is composed of eight major columns, one for classification of the person being recorded, four noting different distance relationships, and three for recording "walk-ins." Except for the classification column, each contains three digital divisions related to a separate variable.

A. *Classification* — A notation should be made of the classification of the person whose relation to the subject is being recorded, by marking the appropriate letter in the space provided:

C — Other client
B — Attendant
S — Supervisor or foreman
P — Professional
A — Administrator
O — Other personnel (explain)

To distinguish between several persons of the same classification who may be included in the Matrix, numerical subscripts should be attached to each letter denoting the person's category. To the extent that some of those included in the Total Observational Matrix will have been included in the work-place layout and in the contact sequence log, the notations should be consistent throughout. Also a notation of the sex of all persons being entered in the total observational matrix should be made by encircling the classification letters of females.

B. *Distance* — This dimension equals the distance of the person being recorded in the Matrix from subject. This distance may fall into one of four categories (0 to 3′, 3′ to 7′, 7′ to 12′, greater than 12′), each of which heads a major column. When the observer has decided into what distance category the person under consideration fits, this will determine under which major column the remaining three variables will be recorded.

C. *Work Flow* — The first digit in each of the major columns is used to describe the relationship of the person being recorded to the subject in the work flow. The appropriate number should,

therefore, be recorded in the first column (under the previously determined distance heading). These work-flow relationships recorded on the total observational matrix should be consistent with those graphically presented on the work-place layout map.

1. Independent
2. S→O
3. O→S
4. Indirect dependence
5. S→O, O
6. O, O→S

1. Independent: In this situation the work of the person being located in the matrix has no effect on subject nor is it affected by subjects's work.

2. S→O: The work of the person being recorded is directly dependent on subject's completion of his task.

3. O→S: The work of subject is directly dependent on the completion of task by the person being located on the matrix.

4. Indirect dependence: The work of either the person being located on the matrix or subject affects the other's work, but not in a direct sense (as in the case of an assembly line where the person being recorded and subject are separated by an intermediate task).

5. O, O→S: The person being located on the matrix is one of two or more persons upon whose work the subject is directly dependent.

6. S→O, O: The person being located on the matrix is one of two or more persons whose work is directly dependent upon the subject's completion of his work task.

D. *Posture* — Aside from walking (to be discussed later) there are two major posture classifications for the person being recorded. To allow for changes that occur during the observational period. this measure will indicate the person's modal posture during the course of the observation. Posture will be recorded by placing the appropriate number in the second digital space:

1. Sitting
2. Standing

E. *Directional orientation* — Directional orientation describes the angular bodily relationship of the person being recorded to

the subject and is determined by shoulder direction. This relationship will be recorded in the third column through the use of a diagram. There are five basic diagramatic relationships: ⊦⊦ = face to face; ⊦⊦ = back to back; ⊦⊦ = side by side; ⊦⊦ = at an angle; ⊦⊦ = in column.

F. *Walk-in* — A person who is neither stationed at subject's work station nor within the prescribed distance requirements, but who is included in the matrix as a result of his walking to subject and interacting with him, will be classified as a "walk-in." Three walk-in columns are included in the Matrix in order to be able to record a person who may walk in and interact with subject more than once. Digits one and three under the walk-in heading are to be recorded as before. Digit two, normally describing posture, will now, however, be used to describe the closest distance of the walk-in to the subject. Observer should then record the appropriate number in the second column:

1. 0 to 3′
2. 3′ to 7′
3. 7′ to 12′
4. > 12′

In the case where the subject moves from his work station to interact with any person who would not normally be included in the Total Observational Matrix, the observer should record in the classification column an "S" followed by the proper notation for the person with whom the subject interacts. Then the three digits will be recorded under a walk-in major column heading in the same manner as they would be recorded for a walk-in.

WORK BEHAVIOR OBSERVATION LOG

Sheet 1 Name of Subject Doe (Last) Sample 3 John (C_{16}) (First)

I. WORK/DELAY SEQUENCE

1	1	1	D_W	1	D_P	A	D_W	1	1	1	D_W	A	D_W	1	1	1	1	1
D_W	1	1	D_P	1	D_P	1	1	1	D_W	1	1	D_W	1	1	1	D_P	1	1
1	1	D_W	1	1	1	D_P	1	1	1	D_P	A	D_P	1	1	1			

II. CONTACT SEQUENCE

Class	Name	Init.	Posture S	Posture O	Term	Posture S	Posture O	D	DOR	Comments
C_{13}		0	⌐	⌐	0	⌐	⌐	1	ᴖᴖ	No Response
C_{68}		S	⌐	|	S	⌐	|	3	ᴖ	
C_{13}		S	⌐	⌐	0	⌐	⌐	1	ᴖᴖ	
C_{13}		0	⌐	⌐	0	⌐	⌐	1	ᴖᴖ	
G_6		S	⌐		0	⌐				Set Event
C_{13}		0	⌐	⌐	S	⌐	⌐	1	ᴖᴖ	
C_{13}		0	⌐	⌐	0	⌐	⌐	1	ᴖᴖ	No Response
S_1		S	⅄	|	0	|	|	1	ᴖᴖ	

WORK BEHAVIOR OBSERVATION LOG

Sheet 2

III. CONTROL INFORMATION

RRC Number 1 Tape Number C-100 Observation Number 5 Observer Lubow

Date 8/1/68 Time, Beginning and End 11:15/11:30 Job Title Hardware Assembly

IV. OBJECT SCOPE

Parts	Tools	Mach.	Cont.	Subs.	Data	Other	Description
V_2 #15							

V. COMMENTS ON DATA:

VI. NARRATIVE DESCRIPTION OF JOB:

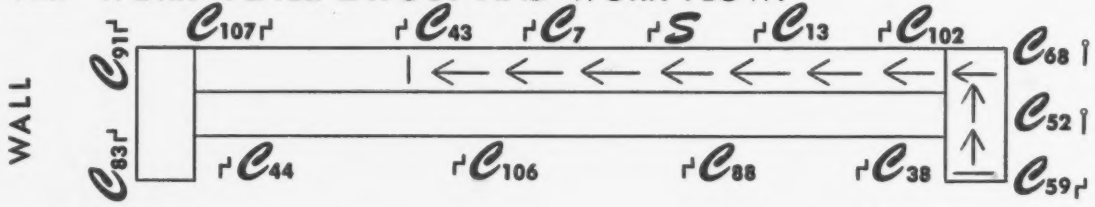
Independent/Team

Subject puts 14 bolts in to a box and passes box on to next person.

VII. SET EVENTS

Number	Nature	Comments
1	Subject asked members of work team if anyone knew the time	

VIII. WORK-PLACE LAYOUT AND WORK FLOW:



IX. SPECIAL COMMENTS:

TOTAL OBSERVATIONAL MATRIX

Class	0 to 3′			3′ to 7′			7′ to 12′			> 12′			Walk-In*			Walk-In*			Walk-In*		
C13	3	1	pp																		
C102				4	1	pp															
C68							4	2	pp												
C52							4	2	pp												
C7				2	1	pp															
C43				4	1	pp															
C38				1	1	pd															
C88				1	1	pd															
C106							1	1	pd												
C77	1	1	dp																		
C59							1	1	pp												
C91							1	1	pp												
C83							1	1	pp												
C44							1	1	pd												
Ss1													1	1	pp						

Digit 1 = Work Flow
1. Independent
2. S→O
3. O→S
4. Indirect dependence
5. S→O, O
6. O, O→S

Digit 2 = Posture
1. Sitting
2. Standing

Digit 3 = Directional Orientation

*When dealing with Walk-In, Digit 2 becomes measure of closest distance achieved in relation to subject:
1. 0 to 3′
2. 3′ to 7′
3. 7′ to 12′
4. > 12′

REMOTE RECORDING CONTROL LOG

RRC Log Ref. # 1 Tape No. C-100 Date 8/1/68 Workshop # N. Y. 105

TESTING PERIOD

Test Start:
a. Time Tape Started 9:15
b. Footage Indicator 0020
c. S. Counter at Start 0000

Test End:
a. Time Tape Off 9:16
b. Footage Indicator 0025
c. S. Counter at End 0000

RECORDING PERIOD

Time Tape Start 9:25
Footage Indicator 0025
S Counter Number 0000

Observation Number	S Number Start	S Number End	Subject Number	Sample	Comments
1	1	2	C_{21}	2	
2	3	4	C_5	2	
3	5	6	C_{19}	3	
4	7	8	C_{41}	2	
5	9	10	C_{16}	3	

Time Tape Stopped 11:30
Footage Indicator 705

S Counter at End 10
Number of Observations 5

Notes